

Figure 9-28 is based on generic luminaires that can be readily identified. As an example, there are many variations of the flat-bottom fluorescent troffer using prismatic lenses. The luminaires in [Figure 9-28](#) are not to be considered as recommended luminaires. The entries for some present useful data even though the luminaires concerned are no longer commonly used. For example, luminaire 2 is largely out of use; however, the coefficients apply to any indirect luminaire of similar efficiency and direct component, since they do not depend on the shape of the upward intensity distribution. An important feature of these coefficients is that the performance of luminaires of similar distributions but different efficiencies may also be analyzed with their use by making a simple multiplicative correction (see note 3 of [Figure 9-28](#)).

Since the light loss factor includes the effect of dirt deposited on wall surfaces, the selection of the proper column of wall reflectances,  $\rho_w$ , should be based on the initial values expected. The wall reflectance should also represent the weighted average of the reflectances of the painted areas, fenestration or daylight controls, chalkboards, shelves, and so forth in the area to be lighted. The weighting should be based on the relative areas of each type of surface within the cavity being considered. In using [Figure 9-29](#), it is often necessary to interpolate between room cavity ratios and effective ceiling cavity reflectances. This is most easily accomplished by interpolating first between RCRs to obtain CUs for effective ceiling cavity reflectances that straddle the actual  $\rho_{CC}$ , and then interpolating between these CUs.

### Instructions and Notes: Tables of Coefficients of Utilization ([Figure 9-28](#))

1. The luminaires in this table are organized by source type and luminaire form rather than by application, for convenience in locating luminaires. In some cases, the data are based on an actual luminaire; in other cases, they represent a composite of generic luminaire types. Therefore, whenever possible, specific luminaire data should be used in preference to those in this table.
2. The polar intensity sketch (intensity distribution curve) and the corresponding luminaire spacing criterion are representative of many luminaires of each type shown. A specific luminaire may differ in perpendicular-plane (crosswise) and parallel-plane (lengthwise) intensity distributions and in spacing criterion from the values shown. However, the various coefficients depend only on the average intensity at each polar angle from nadir. The average intensity values used to generate the coefficients are given at the end of the table, normalized to 1000 lamp lumens for reference.
3. The various coefficients depend only on the average intensity distribution curve and are linearly related to the total luminaire efficiency. Consequently, the tabulated coefficients can be applied to luminaires with similarly shaped average intensity distributions along with a correcting multiplier equal to the new luminaire total efficiency divided by the tabulated luminaire total efficiency. The use of polarizing lenses on fluorescent luminaires has no effect on the coefficients given in this table except as they affect the total luminaire efficiency.
4. Satisfactory installations depend on many factors, including the environment, space utilization, and luminous criteria, as well as the luminaire itself. Consequently, a definitive spacing recommendation cannot be assigned to the luminaire as such. The spacing criterion (SC) values given are only general guides. SC values are not assigned to semi-indirect and indirect luminaires, since the basis of this technique does not apply to such situations. Also, SC values are not given for those bat-wing luminaires that must be located by criteria other than that of horizontal illuminance.

5. Key:

$\rho_{CC}$  = ceiling cavity reflectance (percent),

$\rho_W$  = wall reflectance (percent),

$\rho_{FC}$  = floor cavity reflectance (percent),

RCR = room cavity ratio,

WDRC = wall direct radiation coefficient,

SC = luminaire spacing criterion,

NA = not applicable.

6. Many of the luminaires in this figure appeared in earlier editions of the IESNA *Lighting Handbook*. The identifying number may be different due to a reordering of the luminaires. In some cases, the data have been modified in view of more recent or more extensive information. The user should specifically refer to this edition of the *Lighting Handbook* when referencing luminaires.

7. Fluorescent lamp luminaire efficiencies, and consequently the coefficients, are a function of the number of lamps in relation to the size of the luminaire. This is due to temperature changes and to changes in the blocking of light. In this figure, fluorescent lamp luminaires have been chosen with typical luminaire sizes and numbers of lamps; these are identified under the typical luminaire drawings. Variations of the coefficients with size and number of lamps depend on the many details of luminaire construction. The following correction factors are average values to apply to a four-lamp luminaire 610 mm (2 ft) wide:

No. of lamps	Width, mm	Width, ft	Multiply by
8	1220	4	1.05
3	610	2	1.05
2	610	2	1.1
2	300	1	0.9

Multiply the entries for two-lamp wraparound luminaires by 0.95 for four lamps.

8. Photometric data for fluorescent lamp luminaires in this table are based on tests using standard-wattage fluorescent lamps. Reduced-wattage fluorescent lamps cause lower lamp operating temperatures with some luminaires. Consequently, the efficiency and coefficients may be slightly increased. It is desirable to obtain specific correction factors from the manufacturers. Typical factors for reduced-wattage fluorescent lamps (approximately 10% below standard lamp wattages) are as follows:

Luminaire	Multiply by
2-lamp strip, surface mounted	1.03
4-lamp troffer, enclosed, non-air-handling	1.07
4-lamp wraparound, surface mounted	1.07
2-lamp industrial, vented	1.00

Electronic ballasts can be designed for any arbitrary operating condition. The manufacturer must be consulted for specific data.


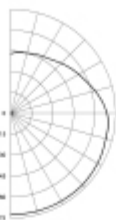


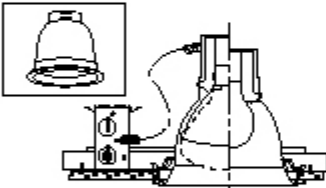

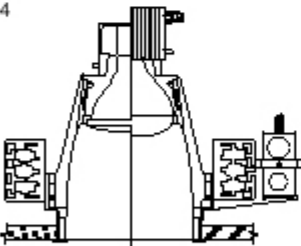
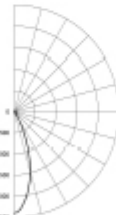
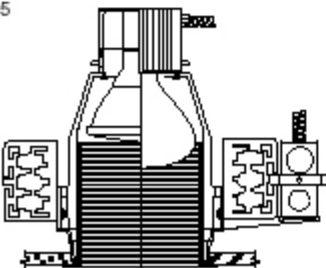

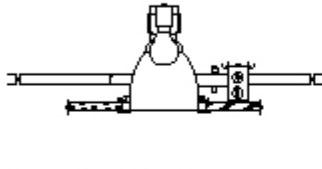
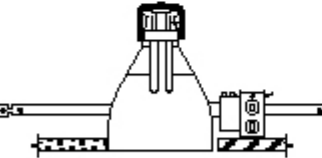

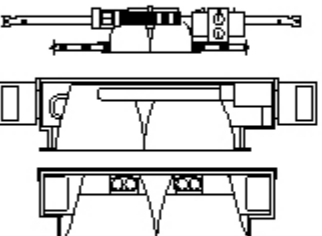
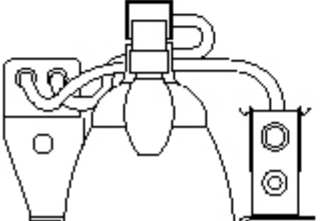
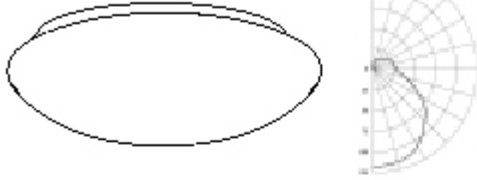
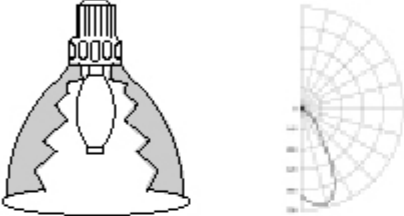
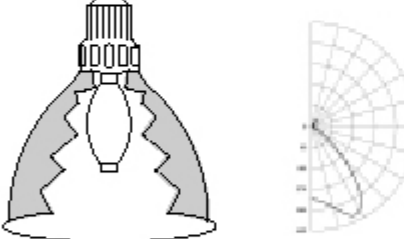
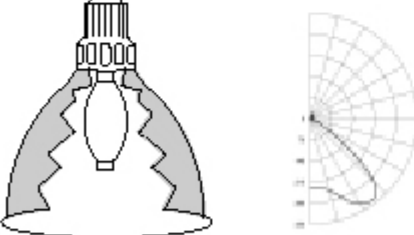

Typical Luminaire		Typical Intensity Distribution	$\rho_{cc} \rightarrow$			80			70			50			30		
			$\rho_w \rightarrow$			70	50	30	70	50	30	50	30	10	50	30	10
			RCR ↓			Lamp = 150A21IF SC (along, across)											
1			0	0.87	0.87	0.87	0.81	0.81	0.81	0.70	0.70	0.70	0.59	0.59	0.59	0.59	0.59
			1	0.76	0.71	0.66	0.70	0.66	0.61	0.56	0.52	0.50	0.46	0.44	0.42	0.42	0.42
			2	0.68	0.60	0.53	0.62	0.55	0.50	0.47	0.42	0.38	0.39	0.35	0.32	0.32	0.32
			3	0.61	0.52	0.44	0.56	0.48	0.41	0.40	0.35	0.31	0.33	0.29	0.26	0.26	0.26
			4	0.55	0.45	0.37	0.51	0.42	0.35	0.35	0.30	0.25	0.29	0.25	0.22	0.22	0.22
			5	0.51	0.40	0.32	0.46	0.37	0.30	0.31	0.25	0.21	0.26	0.21	0.18	0.18	0.18
			6	0.46	0.35	0.28	0.42	0.33	0.26	0.28	0.22	0.18	0.23	0.19	0.16	0.16	0.16
			7	0.43	0.32	0.25	0.39	0.29	0.23	0.25	0.20	0.16	0.21	0.16	0.13	0.13	0.13
			8	0.40	0.29	0.22	0.36	0.27	0.20	0.23	0.17	0.14	0.19	0.15	0.12	0.12	0.12
			9	0.37	0.26	0.19	0.34	0.24	0.18	0.21	0.16	0.12	0.17	0.13	0.10	0.10	0.10
			10	0.34	0.24	0.17	0.32	0.22	0.16	0.19	0.14	0.11	0.16	0.12	0.08	0.08	0.08
				EFF = 80.5%			% DN = 55.9%			% UP = 44.1%			Lamp = 150A21IF SC (along, across)				
2			EFF = 86.5%			% DN = 4.0%			% UP = 96.0%			Lamp = 100A21/5 SC (along, across)					
			0	0.99	0.99	0.99	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.89	0.89
			1	0.91	0.87	0.84	0.89	0.85	0.82	0.82	0.79	0.77	0.79	0.76	0.74	0.74	0.74
			2	0.83	0.76	0.70	0.80	0.74	0.69	0.71	0.67	0.63	0.69	0.65	0.62	0.62	0.62
			3	0.75	0.66	0.59	0.73	0.65	0.59	0.62	0.57	0.53	0.60	0.55	0.52	0.52	0.52
			4	0.69	0.58	0.51	0.67	0.57	0.50	0.55	0.49	0.44	0.53	0.48	0.44	0.44	0.44
			5	0.63	0.52	0.44	0.61	0.51	0.44	0.49	0.43	0.38	0.47	0.42	0.37	0.37	0.37
			6	0.58	0.46	0.39	0.56	0.46	0.38	0.44	0.38	0.33	0.43	0.37	0.33	0.33	0.33
			7	0.53	0.42	0.34	0.52	0.41	0.34	0.40	0.33	0.29	0.39	0.33	0.29	0.29	0.29
			8	0.50	0.38	0.31	0.48	0.37	0.31	0.36	0.30	0.26	0.35	0.30	0.25	0.25	0.25
			9	0.46	0.35	0.28	0.45	0.34	0.28	0.33	0.27	0.23	0.32	0.27	0.23	0.23	0.23
			10	0.43	0.32	0.25	0.42	0.32	0.25	0.31	0.25	0.21	0.30	0.24	0.21	0.21	0.21
				EFF = 100%			% DN = 100%			% UP = 0%			Lamp = 150PAR3 SC (along, across)				
3			0	1.20	1.20	1.20	1.17	1.17	1.17	1.12	1.12	1.12	1.07	1.07	1.07	1.07	1.07
			1	1.14	1.11	1.08	1.11	1.08	1.06	1.04	1.02	1.00	1.01	0.99	0.97	0.97	0.97
			2	1.08	1.02	0.98	1.05	1.01	0.97	0.97	0.94	0.91	0.94	0.92	0.89	0.89	0.89
			3	1.02	0.95	0.90	1.00	0.94	0.89	0.91	0.87	0.84	0.89	0.85	0.82	0.82	0.82
			4	0.97	0.89	0.83	0.95	0.88	0.83	0.86	0.81	0.78	0.84	0.80	0.77	0.77	0.77
			5	0.92	0.84	0.78	0.91	0.83	0.77	0.81	0.76	0.72	0.79	0.75	0.72	0.72	0.72
			6	0.88	0.79	0.73	0.87	0.78	0.73	0.77	0.72	0.68	0.75	0.71	0.68	0.68	0.68
			7	0.84	0.75	0.69	0.83	0.74	0.69	0.73	0.68	0.64	0.72	0.67	0.64	0.64	0.64
			8	0.81	0.71	0.66	0.80	0.71	0.65	0.70	0.65	0.61	0.69	0.64	0.61	0.61	0.61
			9	0.78	0.68	0.62	0.77	0.68	0.62	0.67	0.62	0.58	0.66	0.61	0.58	0.58	0.58
			10	0.75	0.65	0.60	0.74	0.65	0.59	0.64	0.59	0.56	0.63	0.59	0.56	0.56	0.56
				EFF = 66.2%			% DN = 100			% UP = 0			Lamp = 150PAR3 SC (along, across)				
4			0	1.10	1.10	1.10	1.07	1.07	1.07	1.02	1.02	1.02	0.98	0.98	0.98	0.98	0.98
			1	1.06	1.03	1.02	1.03	1.01	1.00	0.98	0.96	0.95	0.94	0.93	0.92	0.92	0.92
			2	1.02	0.98	0.95	1.00	0.96	0.94	0.94	0.91	0.89	0.91	0.89	0.86	0.86	0.86
			3	0.98	0.93	0.90	0.96	0.92	0.89	0.90	0.87	0.85	0.88	0.85	0.83	0.83	0.83
			4	0.94	0.89	0.85	0.93	0.88	0.84	0.86	0.83	0.80	0.84	0.82	0.79	0.79	0.79
			5	0.91	0.85	0.81	0.90	0.84	0.80	0.83	0.79	0.77	0.81	0.78	0.76	0.76	0.76
			6	0.88	0.81	0.77	0.87	0.81	0.77	0.80	0.76	0.73	0.78	0.75	0.73	0.73	0.73
			7	0.85	0.78	0.74	0.84	0.78	0.74	0.77	0.73	0.70	0.76	0.72	0.70	0.70	0.70
			8	0.82	0.75	0.71	0.81	0.75	0.71	0.74	0.70	0.68	0.73	0.70	0.67	0.67	0.67
			9	0.79	0.72	0.68	0.78	0.72	0.68	0.71	0.68	0.65	0.70	0.67	0.65	0.65	0.65
			10	0.77	0.70	0.66	0.76	0.69	0.65	0.69	0.65	0.63	0.68	0.65	0.62	0.62	0.62
				EFF = 66.2%			% DN = 100			% UP = 0			Lamp = 150PAR3 SC (along, across)				
5			0	0.79	0.79	0.79	0.77	0.77	0.77	0.74	0.74	0.74	0.70	0.70	0.70	0.70	0.70
			1	0.76	0.75	0.73	0.75	0.73	0.72	0.71	0.70	0.69	0.68	0.68	0.67	0.67	0.67
			2	0.74	0.71	0.69	0.72	0.70	0.68	0.68	0.67	0.65	0.66	0.65	0.64	0.64	0.64
			3	0.71	0.68	0.66	0.70	0.67	0.65	0.66	0.64	0.62	0.64	0.63	0.61	0.61	0.61
			4	0.69	0.65	0.63	0.68	0.65	0.62	0.63	0.61	0.60	0.62	0.60	0.58	0.58	0.58
			5	0.67	0.63	0.60	0.66	0.62	0.60	0.61	0.59	0.57	0.60	0.58	0.57	0.57	0.57
			6	0.65	0.61	0.58	0.64	0.60	0.58	0.59	0.57	0.55	0.59	0.57	0.55	0.55	0.55
			7	0.63	0.59	0.56	0.62	0.58	0.56	0.57	0.55	0.53	0.57	0.55	0.53	0.53	0.53
			8	0.61	0.57	0.54	0.60	0.56	0.54	0.56	0.53	0.52	0.55	0.53	0.52	0.52	0.52
			9	0.59	0.55	0.52	0.59	0.55	0.52	0.54	0.52	0.50	0.54	0.51	0.50	0.50	0.50
			10	0.58	0.53	0.51	0.57	0.53	0.50	0.53	0.50	0.49	0.52	0.50	0.48	0.48	0.48

Figure 9-28 Continued

Typical Luminaire	Typical Intensity Distribution	$\rho_{cc} \rightarrow$	80			70			50			30		
			$\rho_w \rightarrow$											
		RCR $\downarrow$	EFF = 96.2%			% DN = 100%			% UP = 0%			Lamp = 150A21II SC (along, across)		
<div>6</div> <div></div> <div>A-lamp downlight with spec. anodized reflector</div>	0	0.82	0.82	0.82	0.81	0.81	0.81	0.77	0.77	0.77	0.74	0.74	0.74	
	1	0.78	0.76	0.75	0.77	0.75	0.73	0.72	0.71	0.70	0.70	0.68	0.66	
	2	0.74	0.71	0.68	0.73	0.70	0.67	0.67	0.65	0.63	0.65	0.63	0.61	
	3	0.70	0.66	0.62	0.69	0.65	0.61	0.63	0.60	0.58	0.61	0.59	0.57	
	4	0.66	0.61	0.57	0.65	0.60	0.56	0.58	0.55	0.53	0.57	0.54	0.51	
	5	0.63	0.56	0.52	0.61	0.56	0.52	0.55	0.51	0.48	0.53	0.50	0.47	
	6	0.59	0.53	0.48	0.58	0.52	0.48	0.51	0.47	0.45	0.50	0.47	0.44	
	7	0.56	0.49	0.45	0.55	0.49	0.44	0.48	0.44	0.41	0.47	0.43	0.40	
	8	0.53	0.46	0.41	0.52	0.45	0.41	0.45	0.41	0.38	0.44	0.40	0.37	
	9	0.50	0.43	0.39	0.49	0.43	0.38	0.42	0.38	0.35	0.41	0.38	0.35	
	10	0.47	0.40	0.36	0.47	0.40	0.36	0.39	0.36	0.33	0.39	0.35	0.33	
<div>7</div> <div></div> <div>8" Open reflector downlight (32W CFL)</div>	EFF = 64.9%			% DN = 100%			% UP = 0%			Lamp = CF6/32 SC (along, across)				
	0	0.77	0.77	0.77	0.75	0.75	0.75	0.72	0.72	0.72	0.69	0.69	0.66	
	1	0.73	0.72	0.70	0.72	0.70	0.69	0.67	0.66	0.65	0.65	0.64	0.62	
	2	0.69	0.66	0.63	0.68	0.65	0.62	0.63	0.61	0.59	0.61	0.59	0.56	
	3	0.66	0.61	0.58	0.64	0.60	0.57	0.59	0.56	0.54	0.57	0.55	0.52	
	4	0.62	0.57	0.53	0.61	0.56	0.52	0.55	0.51	0.49	0.53	0.51	0.48	
	5	0.58	0.53	0.49	0.57	0.52	0.48	0.51	0.48	0.45	0.50	0.47	0.44	
	6	0.55	0.49	0.45	0.54	0.48	0.45	0.47	0.44	0.41	0.46	0.43	0.40	
	7	0.52	0.46	0.41	0.51	0.45	0.41	0.44	0.41	0.38	0.44	0.40	0.37	
	8	0.49	0.43	0.38	0.48	0.42	0.38	0.42	0.38	0.35	0.41	0.38	0.35	
	9	0.47	0.40	0.36	0.46	0.40	0.36	0.39	0.35	0.33	0.38	0.35	0.33	
10	0.44	0.37	0.33	0.44	0.37	0.33	0.37	0.33	0.31	0.36	0.33	0.31		
<div>8</div> <div></div> <div>8" Open reflector downlight (2-26W CFL)</div>	EFF = 61.6%			% DN = 100%			% UP = 0%			Lamp = (2) CFQ2 SC (along, across)				
	0	0.73	0.73	0.73	0.72	0.72	0.72	0.68	0.68	0.68	0.66	0.66	0.63	
	1	0.69	0.67	0.66	0.68	0.66	0.64	0.63	0.62	0.61	0.61	0.60	0.58	
	2	0.65	0.61	0.59	0.64	0.60	0.58	0.58	0.56	0.54	0.56	0.55	0.53	
	3	0.61	0.56	0.52	0.59	0.55	0.52	0.53	0.51	0.48	0.52	0.49	0.46	
	4	0.57	0.51	0.47	0.56	0.50	0.47	0.49	0.46	0.43	0.48	0.45	0.42	
	5	0.53	0.47	0.42	0.52	0.46	0.42	0.45	0.41	0.39	0.44	0.41	0.38	
	6	0.50	0.43	0.38	0.48	0.42	0.38	0.41	0.38	0.35	0.40	0.37	0.34	
	7	0.46	0.39	0.35	0.45	0.39	0.35	0.38	0.34	0.31	0.37	0.34	0.31	
	8	0.43	0.36	0.32	0.42	0.36	0.32	0.35	0.31	0.29	0.34	0.31	0.28	
	9	0.41	0.33	0.29	0.40	0.33	0.29	0.33	0.29	0.26	0.32	0.28	0.25	
10	0.38	0.31	0.27	0.37	0.31	0.27	0.30	0.26	0.24	0.30	0.26	0.23		
<div>9</div> <div></div> <div>8" Round with cross baffles</div>	EFF = 40.2%			% DN = 100			% UP = 0			Lamp = (2) CFQ2 SC (along, across)				
	0	0.47	0.47	0.47	0.46	0.46	0.46	0.44	0.44	0.44	0.42	0.42	0.40	
	1	0.45	0.44	0.43	0.44	0.43	0.42	0.41	0.41	0.40	0.40	0.39	0.38	
	2	0.43	0.41	0.39	0.42	0.40	0.38	0.39	0.37	0.36	0.37	0.36	0.35	
	3	0.40	0.37	0.35	0.39	0.37	0.35	0.36	0.34	0.33	0.35	0.33	0.31	
	4	0.38	0.35	0.32	0.37	0.34	0.32	0.33	0.31	0.30	0.32	0.31	0.29	
	5	0.36	0.32	0.29	0.35	0.32	0.29	0.31	0.29	0.27	0.30	0.28	0.26	
	6	0.34	0.30	0.27	0.33	0.29	0.27	0.29	0.27	0.25	0.28	0.26	0.24	
	7	0.32	0.28	0.25	0.31	0.27	0.25	0.27	0.25	0.23	0.26	0.24	0.22	
	8	0.30	0.26	0.23	0.29	0.25	0.23	0.25	0.23	0.21	0.25	0.23	0.21	
	9	0.28	0.24	0.21	0.28	0.24	0.21	0.23	0.21	0.20	0.23	0.21	0.19	
10	0.27	0.22	0.20	0.26	0.22	0.20	0.22	0.20	0.18	0.22	0.20	0.18		
<div>10</div> <div></div> <div>8" Round with cross baffles</div>	EFF = 63.8%			% DN = 78.4			% UP = 21.6			Lamp = M100/C/1 SC (along, across)				
	0	0.76	0.76	0.76	0.74	0.74	0.74	0.71	0.71	0.71	0.68	0.68	0.66	
	1	0.72	0.70	0.68	0.70	0.69	0.67	0.66	0.65	0.64	0.64	0.63	0.61	
	2	0.68	0.64	0.62	0.66	0.63	0.61	0.61	0.59	0.57	0.59	0.57	0.55	
	3	0.64	0.59	0.56	0.63	0.58	0.55	0.57	0.54	0.52	0.55	0.53	0.51	
	4	0.60	0.55	0.51	0.59	0.54	0.50	0.52	0.49	0.47	0.51	0.48	0.46	
	5	0.57	0.51	0.46	0.55	0.50	0.46	0.49	0.45	0.43	0.48	0.45	0.43	
	6	0.53	0.47	0.43	0.52	0.46	0.42	0.45	0.42	0.39	0.44	0.41	0.39	
	7	0.50	0.43	0.39	0.49	0.43	0.39	0.43	0.39	0.36	0.41	0.38	0.35	
	8	0.47	0.40	0.36	0.46	0.40	0.36	0.40	0.36	0.33	0.38	0.35	0.33	
	9	0.44	0.37	0.33	0.44	0.37	0.33	0.37	0.33	0.31	0.36	0.33	0.31	
10	0.41	0.34	0.30	0.41	0.34	0.30	0.34	0.30	0.28	0.33	0.30	0.28		

		0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	
Metal halide downlight	8	0.47	0.41	0.36	0.46	0.40	0.36	0.39	0.36	0.33	0.39	0.35	0.3
	9	0.45	0.38	0.34	0.44	0.37	0.33	0.37	0.33	0.31	0.36	0.33	0.3
	10	0.42	0.35	0.31	0.42	0.35	0.31	0.35	0.31	0.28	0.34	0.31	0.2

Figure 9-28 *Continued*

Typical Luminaire	Typical Intensity Distribution	$\rho_{cc} \rightarrow$			80			70			50			30		
		$\rho_w \rightarrow$			70	50	30	70	50	30	50	30	10	50	30	10
		RCR ↓			EFF = 55.9%			% DN = 76.2%			% UP = 23.8%			Lamp = 22 & 32V SC (along, across)		
11		0	0.63	0.63	0.63	0.60	0.60	0.60	0.55	0.55	0.55	0.50	0.50	0.50	0.50	0.50
		1	0.57	0.54	0.51	0.54	0.51	0.48	0.46	0.44	0.42	0.42	0.40	0.40	0.40	0.38
		2	0.51	0.46	0.42	0.48	0.44	0.40	0.40	0.37	0.34	0.36	0.33	0.33	0.31	0.28
		3	0.46	0.40	0.35	0.44	0.38	0.34	0.35	0.31	0.28	0.31	0.28	0.28	0.24	0.21
		4	0.42	0.35	0.30	0.40	0.34	0.29	0.31	0.27	0.24	0.28	0.24	0.24	0.20	0.16
		5	0.39	0.31	0.26	0.37	0.30	0.25	0.27	0.23	0.20	0.25	0.21	0.21	0.16	0.12
		6	0.36	0.28	0.23	0.34	0.27	0.22	0.24	0.20	0.18	0.22	0.19	0.19	0.14	0.10
		7	0.33	0.25	0.20	0.31	0.24	0.20	0.22	0.18	0.15	0.20	0.17	0.17	0.12	0.08
		8	0.31	0.23	0.18	0.29	0.22	0.18	0.20	0.16	0.14	0.18	0.15	0.15	0.10	0.06
		9	0.28	0.21	0.16	0.27	0.20	0.16	0.18	0.15	0.12	0.17	0.14	0.14	0.09	0.05
		10	0.27	0.19	0.15	0.25	0.19	0.14	0.17	0.13	0.11	0.16	0.13	0.13	0.08	0.04
CFL surface-mounted disk																
12			EFF = 87.5%			% DN = 85.9%			% UP = 1.6%			Lamp = M400/C/I SC (along, across)				
		0	1.04	1.04	1.04	1.01	1.01	1.01	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92
		1	0.98	0.95	0.93	0.96	0.93	0.91	0.89	0.87	0.86	0.86	0.84	0.84	0.83	0.81
		2	0.92	0.87	0.83	0.90	0.85	0.82	0.82	0.79	0.76	0.79	0.77	0.77	0.74	0.71
		3	0.86	0.80	0.75	0.84	0.78	0.74	0.76	0.72	0.69	0.73	0.70	0.70	0.66	0.61
		4	0.81	0.73	0.68	0.79	0.72	0.67	0.70	0.66	0.62	0.68	0.64	0.64	0.59	0.54
		5	0.76	0.68	0.62	0.74	0.67	0.61	0.65	0.60	0.56	0.63	0.59	0.59	0.54	0.49
		6	0.72	0.63	0.57	0.70	0.62	0.56	0.60	0.55	0.52	0.59	0.54	0.54	0.49	0.44
		7	0.67	0.58	0.52	0.66	0.58	0.52	0.56	0.51	0.47	0.55	0.50	0.50	0.44	0.39
		8	0.64	0.54	0.48	0.62	0.54	0.48	0.53	0.47	0.44	0.51	0.47	0.47	0.41	0.36
		9	0.60	0.51	0.45	0.59	0.50	0.45	0.49	0.44	0.41	0.48	0.44	0.44	0.38	0.33
		10	0.57	0.48	0.42	0.56	0.47	0.42	0.46	0.41	0.38	0.45	0.41	0.41	0.35	0.30
High bay, open metal reflector, narrow																
13			EFF = 83.9%			% DN = 95.2%			% UP = 4.8%			Lamp = M400/C/I SC (along, across)				
		0	0.99	0.99	0.99	0.96	0.96	0.96	0.91	0.91	0.91	0.86	0.86	0.86	0.86	0.86
		1	0.93	0.90	0.87	0.90	0.88	0.85	0.83	0.81	0.80	0.80	0.78	0.78	0.77	0.75
		2	0.86	0.81	0.77	0.84	0.79	0.75	0.76	0.73	0.70	0.73	0.70	0.70	0.66	0.61
		3	0.80	0.73	0.68	0.78	0.72	0.67	0.65	0.65	0.61	0.66	0.63	0.63	0.59	0.54
		4	0.75	0.67	0.61	0.73	0.65	0.60	0.63	0.58	0.54	0.61	0.57	0.57	0.52	0.47
		5	0.70	0.61	0.54	0.68	0.59	0.54	0.57	0.52	0.48	0.55	0.51	0.51	0.46	0.41
		6	0.65	0.55	0.49	0.63	0.54	0.48	0.53	0.47	0.43	0.51	0.46	0.46	0.41	0.36
		7	0.60	0.51	0.44	0.59	0.50	0.44	0.48	0.43	0.39	0.47	0.42	0.42	0.37	0.32
		8	0.56	0.47	0.40	0.55	0.46	0.40	0.44	0.39	0.35	0.43	0.38	0.38	0.33	0.28
		9	0.53	0.43	0.37	0.52	0.42	0.36	0.41	0.36	0.32	0.40	0.35	0.35	0.30	0.25
		10	0.50	0.40	0.34	0.48	0.39	0.33	0.38	0.33	0.29	0.37	0.32	0.32	0.27	0.22
High bay, open metal reflector, medium																
14			EFF = 83.8%			% DN = 97			% UP = 3			Lamp = M400/C/I SC (along, across)				
		0	0.99	0.99	0.99	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87	0.87	0.87
		1	0.92	0.89	0.86	0.90	0.87	0.84	0.83	0.81	0.79	0.80	0.78	0.78	0.76	0.73
		2	0.85	0.80	0.75	0.83	0.78	0.73	0.75	0.71	0.68	0.72	0.69	0.69	0.65	0.60
		3	0.79	0.71	0.65	0.76	0.70	0.64	0.67	0.62	0.58	0.64	0.60	0.60	0.55	0.50
		4	0.72	0.63	0.57	0.70	0.62	0.56	0.60	0.55	0.51	0.58	0.53	0.53	0.48	0.43
		5	0.67	0.57	0.50	0.65	0.56	0.50	0.54	0.48	0.44	0.52	0.47	0.47	0.42	0.37
		6	0.62	0.51	0.44	0.60	0.50	0.44	0.49	0.43	0.39	0.47	0.42	0.42	0.37	0.32
		7	0.57	0.46	0.40	0.56	0.46	0.39	0.44	0.38	0.34	0.43	0.38	0.38	0.33	0.28
		8	0.53	0.42	0.35	0.52	0.42	0.35	0.40	0.34	0.30	0.39	0.34	0.34	0.29	0.24
		9	0.49	0.39	0.32	0.48	0.38	0.32	0.37	0.31	0.27	0.36	0.31	0.31	0.26	0.21
		10	0.46	0.35	0.29	0.45	0.35	0.29	0.34	0.28	0.24	0.33	0.28	0.28	0.23	0.18
High bay, open metal reflector, wide																
15			EFF = 61.4%			% DN = 80.6			% UP = 19.4			Lamp = M400/C/I SC (along, across)				
		0	0.70	0.70	0.70	0.67	0.67	0.67	0.62	0.62	0.62	0.56	0.56	0.56	0.56	0.56
		1	0.65	0.62	0.60	0.62	0.59	0.57	0.55	0.53	0.52	0.50	0.49	0.49	0.48	0.47
		2	0.60	0.55	0.52	0.57	0.53	0.50	0.49	0.47	0.45	0.46	0.44	0.44	0.42	0.40
		3	0.56	0.50	0.46	0.53	0.48	0.44	0.45	0.42	0.39	0.42	0.39	0.39	0.36	0.33



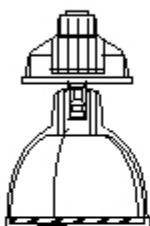
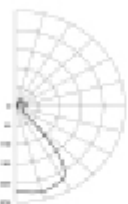
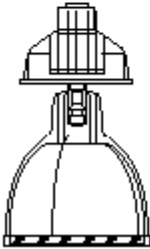
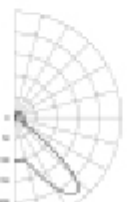

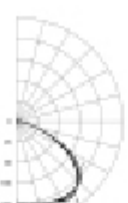

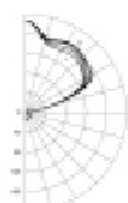



 High bay, open prismatic reflector, narrow		4	0.52	0.45	0.41	0.49	0.44	0.40	0.41	0.38	0.35	0.38	0.35	0.33
		5	0.48	0.41	0.37	0.46	0.40	0.36	0.38	0.34	0.31	0.35	0.32	0.30
		6	0.45	0.38	0.33	0.43	0.37	0.33	0.35	0.31	0.28	0.33	0.30	0.27
		7	0.42	0.35	0.30	0.40	0.34	0.30	0.32	0.28	0.26	0.30	0.27	0.24
		8	0.40	0.32	0.28	0.38	0.31	0.27	0.30	0.26	0.24	0.28	0.25	0.23
		9	0.37	0.30	0.26	0.36	0.29	0.25	0.28	0.24	0.22	0.26	0.23	0.21
		10	0.35	0.28	0.24	0.34	0.27	0.23	0.26	0.22	0.20	0.25	0.22	0.19

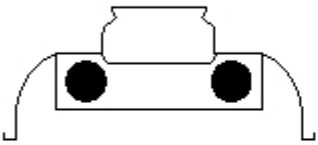
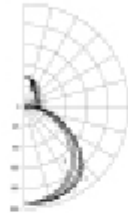
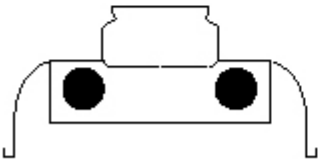
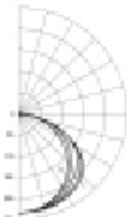

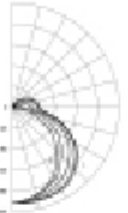

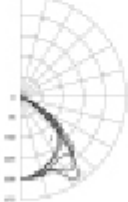


Figure 9-28 *Continued*

Typical Luminaire	Typical Intensity Distribution	$\rho_{cc} \rightarrow$	80			70			50			30			
		$\rho_w \rightarrow$	70	50	30	70	50	30	50	30	10	50	30	10	
		RCR ↓	EFF = 59%			% DN = 77.9%			% UP = 22.1%			Lamp = M400/C/L SC (along, across,			
16			0	0.67	0.67	0.67	0.64	0.64	0.64	0.58	0.58	0.58	0.53	0.53	0.53
			1	0.62	0.59	0.57	0.59	0.57	0.55	0.52	0.50	0.49	0.48	0.46	0.45
			2	0.57	0.53	0.50	0.55	0.51	0.48	0.47	0.45	0.43	0.43	0.41	0.40
			3	0.53	0.48	0.44	0.51	0.46	0.43	0.43	0.40	0.37	0.40	0.37	0.35
			4	0.50	0.44	0.39	0.47	0.42	0.38	0.39	0.36	0.33	0.36	0.34	0.32
			5	0.46	0.40	0.35	0.44	0.38	0.34	0.36	0.33	0.30	0.33	0.31	0.28
			6	0.43	0.37	0.32	0.41	0.35	0.31	0.33	0.30	0.27	0.31	0.28	0.26
			7	0.40	0.34	0.29	0.39	0.33	0.28	0.31	0.27	0.25	0.29	0.26	0.24
			8	0.38	0.31	0.27	0.36	0.30	0.26	0.28	0.25	0.22	0.27	0.24	0.22
			9	0.36	0.29	0.24	0.34	0.28	0.24	0.26	0.23	0.21	0.25	0.22	0.20
			10	0.33	0.27	0.23	0.32	0.26	0.22	0.24	0.21	0.19	0.23	0.20	0.18
High bay, open prismatic reflector, medium			EFF = 61.5%			% DN = 83.7%			% UP = 16.3%			Lamp = M400/C/L SC (along, across,			
17			0	0.71	0.71	0.71	0.68	0.68	0.68	0.63	0.63	0.63	0.58	0.58	0.58
			1	0.65	0.62	0.59	0.62	0.59	0.57	0.55	0.53	0.52	0.51	0.50	0.48
			2	0.59	0.55	0.51	0.57	0.53	0.49	0.49	0.46	0.43	0.45	0.43	0.41
			3	0.54	0.48	0.44	0.52	0.47	0.42	0.43	0.40	0.37	0.40	0.38	0.35
			4	0.50	0.43	0.38	0.48	0.42	0.37	0.39	0.35	0.32	0.36	0.33	0.30
			5	0.46	0.38	0.33	0.44	0.37	0.32	0.35	0.31	0.27	0.32	0.29	0.26
			6	0.42	0.34	0.29	0.40	0.33	0.28	0.31	0.27	0.24	0.29	0.26	0.23
			7	0.39	0.31	0.26	0.37	0.30	0.25	0.28	0.24	0.21	0.27	0.23	0.20
			8	0.36	0.28	0.23	0.35	0.27	0.22	0.26	0.21	0.18	0.24	0.20	0.18
			9	0.34	0.25	0.21	0.32	0.25	0.20	0.23	0.19	0.16	0.22	0.18	0.16
			10	0.31	0.23	0.19	0.30	0.23	0.18	0.21	0.17	0.15	0.20	0.17	0.14
High bay, open prismatic reflector, wide			EFF = 72.5%			% DN = 97.8%			% UP = 2.2%			Lamp = M400/C/L SC (along, across,			
18			0	0.86	0.86	0.86	0.84	0.84	0.84	0.80	0.80	0.80	0.76	0.76	0.76
			1	0.78	0.75	0.71	0.76	0.73	0.70	0.69	0.67	0.65	0.66	0.64	0.63
			2	0.71	0.65	0.60	0.69	0.63	0.59	0.60	0.56	0.53	0.58	0.54	0.52
			3	0.64	0.56	0.50	0.62	0.55	0.50	0.53	0.48	0.44	0.51	0.46	0.43
			4	0.59	0.50	0.43	0.57	0.49	0.42	0.47	0.41	0.37	0.45	0.40	0.36
			5	0.54	0.44	0.37	0.52	0.43	0.37	0.41	0.36	0.32	0.40	0.35	0.31
			6	0.49	0.39	0.33	0.48	0.39	0.32	0.37	0.31	0.27	0.36	0.31	0.27
			7	0.46	0.35	0.29	0.44	0.35	0.28	0.33	0.28	0.24	0.32	0.27	0.23
			8	0.42	0.32	0.26	0.41	0.31	0.25	0.30	0.25	0.21	0.29	0.24	0.21
			9	0.39	0.29	0.23	0.38	0.29	0.23	0.28	0.22	0.19	0.27	0.22	0.18
			10	0.37	0.27	0.21	0.36	0.26	0.21	0.26	0.20	0.17	0.25	0.20	0.17
Low bay with drop lens, narrow			EFF = 75.3%			% DN = 8.1			% UP = 91.9			Lamp = M175/C* SC (along, across,			
19			0	0.73	0.73	0.73	0.63	0.63	0.63	0.45	0.45	0.45	0.29	0.29	0.29
			1	0.66	0.63	0.60	0.57	0.55	0.52	0.39	0.38	0.36	0.25	0.24	0.23
			2	0.60	0.55	0.51	0.52	0.48	0.44	0.34	0.32	0.30	0.21	0.20	0.19
			3	0.55	0.48	0.43	0.47	0.42	0.37	0.30	0.27	0.25	0.19	0.17	0.16
			4	0.50	0.42	0.37	0.43	0.37	0.32	0.26	0.23	0.21	0.17	0.15	0.13
			5	0.46	0.37	0.32	0.39	0.33	0.28	0.23	0.20	0.18	0.15	0.13	0.11
			6	0.42	0.33	0.28	0.36	0.29	0.24	0.21	0.18	0.15	0.13	0.11	0.10
			7	0.39	0.30	0.24	0.33	0.26	0.21	0.19	0.16	0.13	0.12	0.10	0.09
			8	0.36	0.27	0.21	0.31	0.23	0.19	0.17	0.14	0.12	0.11	0.09	0.07
			9	0.33	0.24	0.19	0.28	0.21	0.17	0.15	0.12	0.10	0.10	0.08	0.07
			10	0.31	0.22	0.17	0.26	0.19	0.15	0.14	0.11	0.09	0.09	0.07	0.06
Glowing suspended bowl, MH			EFF = 81.5%			% DN = 15.3			% UP = 84.7			Lamp = (4) FT39* SC (along, across,			
20			0	0.81	0.81	0.81	0.71	0.71	0.71	0.52	0.52	0.52	0.35	0.35	0.35

	0	0.73	0.69	0.66	0.64	0.61	0.58	0.45	0.43	0.42	0.30	0.29	0.28
	1	0.66	0.60	0.55	0.58	0.53	0.49	0.39	0.36	0.34	0.26	0.25	0.23
	2	0.60	0.53	0.47	0.53	0.46	0.42	0.34	0.31	0.29	0.23	0.21	0.20
	3	0.55	0.47	0.40	0.48	0.41	0.36	0.30	0.27	0.24	0.20	0.18	0.17
	4	0.50	0.41	0.35	0.44	0.36	0.31	0.27	0.23	0.20	0.18	0.16	0.14
	5	0.46	0.37	0.30	0.40	0.32	0.27	0.24	0.20	0.18	0.16	0.14	0.12
	6	0.42	0.33	0.27	0.37	0.29	0.24	0.22	0.18	0.15	0.15	0.12	0.11
	7	0.39	0.30	0.24	0.34	0.26	0.21	0.20	0.16	0.13	0.13	0.11	0.09
	8	0.36	0.27	0.21	0.32	0.24	0.19	0.18	0.14	0.12	0.12	0.10	0.08
	9	0.34	0.25	0.19	0.30	0.22	0.17	0.16	0.13	0.11	0.11	0.09	0.07
	10												

Glowing suspended bowl, CFL

Figure 9-28 Continued


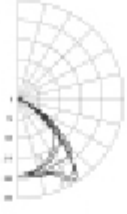

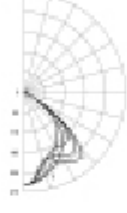
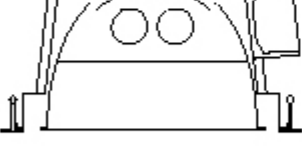
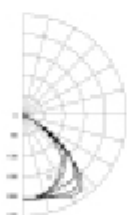
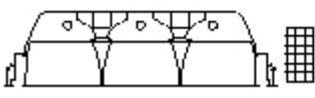

Typical Luminaire	Typical Intensity Distribution	pcc →			70			50			30		
		ρw →			70	50	30	70	50	30	50	30	10
		RCR ↓			Lamp = (2) F40T1 SC (along, across)								
21  Industrial, white enamel reflector, 20% up		EFF = 90.5%			% DN = 78.2%			% UP = 21.8%					
		0	1.03	1.03	1.03	0.98	0.98	0.98	0.90	0.90	0.90	0.82	0.82
		1	0.93	0.89	0.85	0.89	0.85	0.81	0.77	0.74	0.72	0.70	0.68
		2	0.84	0.77	0.71	0.80	0.74	0.68	0.67	0.63	0.59	0.61	0.58
		3	0.77	0.67	0.60	0.73	0.64	0.58	0.59	0.53	0.49	0.54	0.49
		4	0.70	0.59	0.51	0.66	0.57	0.50	0.52	0.46	0.41	0.48	0.43
		5	0.64	0.53	0.45	0.61	0.51	0.43	0.46	0.40	0.35	0.43	0.37
		6	0.59	0.47	0.39	0.56	0.45	0.38	0.42	0.35	0.31	0.38	0.33
		7	0.55	0.43	0.35	0.52	0.41	0.34	0.38	0.32	0.27	0.35	0.30
		8	0.51	0.39	0.31	0.48	0.37	0.30	0.34	0.28	0.24	0.32	0.27
		9	0.47	0.35	0.28	0.45	0.34	0.27	0.32	0.26	0.21	0.29	0.24
		10	0.44	0.33	0.26	0.42	0.31	0.25	0.29	0.23	0.19	0.27	0.22
22  Industrial, white enamel reflector, down only		EFF = 86.9%			% DN = 100%			% UP = 0%			Lamp = (2) F40T1 SC (along, across)		
		0	1.03	1.03	1.03	1.01	1.01	1.01	0.97	0.97	0.97	0.92	0.92
		1	0.94	0.90	0.86	0.92	0.88	0.84	0.84	0.81	0.79	0.81	0.79
		2	0.85	0.78	0.72	0.83	0.76	0.70	0.73	0.68	0.64	0.70	0.66
		3	0.77	0.68	0.60	0.75	0.66	0.59	0.64	0.58	0.53	0.61	0.56
		4	0.70	0.60	0.52	0.68	0.58	0.51	0.56	0.50	0.45	0.54	0.48
		5	0.65	0.53	0.45	0.63	0.52	0.44	0.50	0.43	0.38	0.48	0.42
		6	0.59	0.47	0.39	0.58	0.47	0.39	0.45	0.38	0.33	0.43	0.37
		7	0.55	0.43	0.35	0.53	0.42	0.35	0.41	0.34	0.29	0.39	0.33
		8	0.51	0.39	0.31	0.50	0.38	0.31	0.37	0.30	0.26	0.36	0.30
		9	0.48	0.36	0.28	0.46	0.35	0.28	0.34	0.28	0.23	0.33	0.27
		10	0.45	0.33	0.26	0.43	0.32	0.25	0.31	0.25	0.21	0.31	0.25
23  2-Lamp bare strip		EFF = 89.3%			% DN = 86.4%			% UP = 13.6%			Lamp = (2) F40T1 SC (along, across)		
		0	1.03	1.03	1.03	1.00	1.00	1.00	0.92	0.92	0.92	0.86	0.86
		1	0.93	0.88	0.83	0.89	0.84	0.80	0.78	0.75	0.72	0.73	0.70
		2	0.83	0.75	0.68	0.80	0.72	0.66	0.67	0.62	0.58	0.62	0.58
		3	0.75	0.65	0.57	0.72	0.63	0.56	0.58	0.52	0.47	0.54	0.49
		4	0.69	0.57	0.49	0.65	0.55	0.47	0.51	0.45	0.40	0.48	0.42
		5	0.63	0.51	0.42	0.60	0.49	0.41	0.46	0.39	0.34	0.43	0.37
		6	0.58	0.45	0.37	0.55	0.44	0.36	0.41	0.34	0.29	0.38	0.32
		7	0.53	0.41	0.33	0.51	0.40	0.32	0.37	0.30	0.26	0.35	0.29
		8	0.50	0.37	0.29	0.47	0.36	0.29	0.34	0.27	0.23	0.32	0.26
		9	0.46	0.34	0.26	0.44	0.33	0.26	0.31	0.25	0.20	0.29	0.24
		10	0.43	0.31	0.24	0.41	0.30	0.23	0.29	0.22	0.18	0.27	0.21
24  2 × 4, 3-Lamp parabolic troffer with 3" semi-spec. louvers, 18 cells		EFF = 72.7%			% DN = 100			% UP = 0			Lamp = (3) F32T8 SC (along, across)		
		0	0.87	0.87	0.87	0.85	0.85	0.85	0.81	0.81	0.81	0.77	0.77
		1	0.81	0.78	0.76	0.79	0.77	0.74	0.74	0.72	0.70	0.71	0.69
		2	0.75	0.70	0.66	0.73	0.69	0.65	0.66	0.63	0.61	0.64	0.61
		3	0.69	0.63	0.58	0.68	0.62	0.57	0.60	0.56	0.52	0.58	0.54
		4	0.64	0.56	0.51	0.62	0.55	0.50	0.54	0.49	0.46	0.52	0.48
		5	0.59	0.51	0.45	0.58	0.50	0.44	0.48	0.44	0.40	0.47	0.43
		6	0.55	0.46	0.40	0.53	0.45	0.40	0.44	0.39	0.35	0.43	0.38
		7	0.51	0.42	0.36	0.50	0.41	0.36	0.40	0.35	0.31	0.39	0.35
		8	0.47	0.38	0.32	0.46	0.38	0.32	0.37	0.32	0.28	0.36	0.31
		9	0.44	0.35	0.29	0.43	0.35	0.29	0.34	0.29	0.25	0.33	0.29
		10	0.41	0.32	0.27	0.40	0.32	0.27	0.31	0.26	0.23	0.31	0.26
25 		EFF = 88.3%			% DN = 100			% UP = 0			Lamp = (3) F40T1 SC (along, across)		



2 x 4, 3-Lamp parabolic troffer  
with 4" semi-spec. louvers, 18  
cells


	EFF = 66.2%			% DN = 100			% UP = 0			SC (along, across)		
0	0.79	0.79	0.79	0.77	0.77	0.77	0.74	0.74	0.74	0.70	0.70	0.70
1	0.74	0.72	0.69	0.72	0.70	0.68	0.67	0.66	0.64	0.65	0.64	0.62
2	0.69	0.64	0.61	0.67	0.63	0.60	0.61	0.58	0.56	0.59	0.57	0.55
3	0.63	0.58	0.53	0.62	0.57	0.53	0.55	0.51	0.48	0.53	0.50	0.48
4	0.59	0.52	0.47	0.57	0.51	0.47	0.50	0.46	0.42	0.48	0.45	0.42
5	0.54	0.47	0.42	0.53	0.46	0.41	0.45	0.41	0.37	0.44	0.40	0.37
6	0.50	0.43	0.37	0.49	0.42	0.37	0.41	0.36	0.33	0.40	0.36	0.33
7	0.47	0.39	0.33	0.46	0.38	0.33	0.37	0.33	0.30	0.36	0.32	0.29
8	0.44	0.35	0.30	0.43	0.35	0.30	0.34	0.30	0.26	0.33	0.29	0.26
9	0.41	0.33	0.27	0.40	0.32	0.27	0.31	0.27	0.24	0.31	0.27	0.24
10	0.38	0.30	0.25	0.37	0.30	0.25	0.29	0.25	0.22	0.28	0.24	0.22

Figure 9-28 Continued

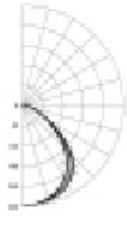
Typical Luminaire	Typical Intensity Distribution	Typical Intensity Distribution																		
		$\rho_{cc} \rightarrow$			80			70			50			30						
		$\rho_{w} \rightarrow$			70	50	30	70	50	30	50	30	10	50	30	10				
		RCR ↓	EFF = 67.8%									% DN = 100%			% UP = 0%			Lamp = (3) FT40 SC (along, across)		
 2 x 2, 3-Lamp with 3" semi-spec. louvers, 9 cells		0	0.81	0.81	0.81	0.79	0.79	0.79	0.75	0.75	0.75	0.72	0.72	0.72	0.72	0.72	0.72			
		1	0.75	0.73	0.71	0.74	0.71	0.69	0.69	0.67	0.66	0.66	0.65	0.65	0.65	0.65	0.65			
		2	0.70	0.65	0.62	0.68	0.64	0.61	0.62	0.59	0.57	0.60	0.57	0.55	0.55	0.55	0.55			
		3	0.65	0.59	0.54	0.63	0.58	0.53	0.56	0.52	0.49	0.54	0.51	0.48	0.48	0.48	0.48			
		4	0.60	0.53	0.48	0.58	0.52	0.47	0.50	0.46	0.43	0.49	0.45	0.42	0.42	0.42	0.42			
		5	0.55	0.47	0.42	0.54	0.47	0.42	0.45	0.41	0.38	0.44	0.40	0.37	0.37	0.37	0.37			
		6	0.51	0.43	0.38	0.50	0.42	0.37	0.41	0.37	0.33	0.40	0.36	0.33	0.33	0.33	0.33			
		7	0.47	0.39	0.34	0.46	0.39	0.33	0.38	0.33	0.30	0.37	0.32	0.29	0.29	0.29	0.29			
		8	0.44	0.36	0.30	0.43	0.35	0.30	0.34	0.30	0.27	0.34	0.29	0.26	0.26	0.26	0.26			
		9	0.41	0.33	0.28	0.40	0.32	0.27	0.32	0.27	0.24	0.31	0.27	0.24	0.24	0.24	0.24			
		10	0.39	0.30	0.25	0.38	0.30	0.25	0.29	0.25	0.22	0.29	0.25	0.22	0.22	0.22	0.22			
 2 x 2, 2-Lamp (U) parabolic troffer with 3" semi-spec. louver, 16 cells		EFF = 50.8%			% DN = 100%			% UP = 0%			Lamp = (2) F31T1 SC (along, across)									
		0	0.61	0.61	0.61	0.59	0.59	0.59	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56			
		1	0.57	0.55	0.53	0.55	0.54	0.52	0.52	0.50	0.49	0.52	0.50	0.48	0.48	0.48	0.48			
		2	0.53	0.49	0.47	0.51	0.48	0.46	0.47	0.45	0.43	0.47	0.45	0.43	0.43	0.43	0.43			
		3	0.49	0.44	0.41	0.48	0.43	0.40	0.42	0.39	0.37	0.42	0.39	0.37	0.37	0.37	0.37			
		4	0.45	0.40	0.36	0.44	0.39	0.36	0.38	0.35	0.32	0.38	0.35	0.33	0.33	0.33	0.33			
		5	0.42	0.36	0.32	0.41	0.35	0.32	0.34	0.31	0.29	0.34	0.31	0.28	0.28	0.28	0.28			
		6	0.39	0.33	0.29	0.38	0.32	0.28	0.31	0.28	0.25	0.31	0.28	0.25	0.25	0.25	0.25			
		7	0.36	0.30	0.26	0.35	0.29	0.25	0.29	0.25	0.23	0.29	0.25	0.23	0.23	0.23	0.23			
		8	0.33	0.27	0.23	0.33	0.27	0.23	0.26	0.23	0.20	0.26	0.23	0.20	0.20	0.20	0.20			
		9	0.31	0.25	0.21	0.31	0.25	0.21	0.24	0.21	0.18	0.24	0.21	0.18	0.18	0.18	0.18			
10	0.29	0.23	0.19	0.29	0.23	0.19	0.22	0.19	0.17	0.22	0.19	0.17	0.17	0.17	0.17					
 1 x 4, 2-Lamp parabolic troffer with 3" semi-spec. louver, 8 or 9 cells		EFF = 67.2%			% DN = 100%			% UP = 0%			Lamp = (2) F32T1 SC (along, across)									
		0	0.80	0.80	0.80	0.78	0.78	0.78	0.75	0.75	0.75	0.72	0.72	0.72	0.72	0.72	0.72			
		1	0.75	0.73	0.70	0.73	0.71	0.69	0.68	0.67	0.65	0.66	0.64	0.64	0.64	0.64	0.64			
		2	0.70	0.65	0.61	0.68	0.64	0.61	0.62	0.59	0.56	0.59	0.57	0.54	0.54	0.54	0.54			
		3	0.64	0.58	0.54	0.63	0.57	0.53	0.55	0.52	0.49	0.54	0.51	0.48	0.48	0.48	0.48			
		4	0.59	0.52	0.47	0.58	0.52	0.47	0.50	0.46	0.43	0.49	0.45	0.42	0.42	0.42	0.42			
		5	0.55	0.47	0.42	0.54	0.47	0.42	0.45	0.41	0.37	0.44	0.40	0.37	0.37	0.37	0.37			
		6	0.51	0.43	0.37	0.50	0.42	0.37	0.41	0.36	0.33	0.40	0.36	0.33	0.33	0.33	0.33			
		7	0.47	0.39	0.34	0.46	0.38	0.33	0.37	0.33	0.29	0.36	0.32	0.29	0.29	0.29	0.29			
		8	0.44	0.36	0.30	0.43	0.35	0.30	0.34	0.30	0.26	0.33	0.29	0.26	0.26	0.26	0.26			
		9	0.41	0.33	0.27	0.40	0.32	0.27	0.31	0.27	0.24	0.31	0.27	0.24	0.24	0.24	0.24			
10	0.38	0.30	0.25	0.38	0.30	0.25	0.29	0.25	0.22	0.28	0.24	0.22	0.22	0.22	0.22					
 2 x 4, 3-Lamp parabolic troffer, spec. louvers, 18 cells, RP-1		EFF = 67.2%			% DN = 100			% UP = 0			Lamp = (3) F32T1 SC (along, across)									
		0	0.80	0.80	0.80	0.78	0.78	0.78	0.75	0.75	0.75	0.72	0.72	0.72	0.72	0.72	0.72			
		1	0.76	0.74	0.72	0.74	0.72	0.70	0.69	0.68	0.67	0.67	0.66	0.66	0.66	0.66	0.66			
		2	0.71	0.67	0.64	0.70	0.66	0.63	0.64	0.62	0.59	0.62	0.60	0.58	0.58	0.58	0.58			
		3	0.67	0.62	0.58	0.65	0.61	0.57	0.59	0.56	0.53	0.57	0.54	0.52	0.52	0.52	0.52			
		4	0.62	0.56	0.52	0.61	0.56	0.51	0.54	0.50	0.48	0.53	0.50	0.47	0.47	0.47	0.47			
		5	0.58	0.52	0.47	0.57	0.51	0.47	0.50	0.46	0.43	0.49	0.45	0.42	0.42	0.42	0.42			
		6	0.55	0.47	0.43	0.53	0.47	0.42	0.46	0.42	0.39	0.45	0.41	0.38	0.38	0.38	0.38			
		7	0.51	0.44	0.39	0.50	0.43	0.39	0.42	0.38	0.35	0.41	0.38	0.34	0.34	0.34	0.34			
		8	0.48	0.40	0.36	0.47	0.40	0.35	0.39	0.35	0.32	0.38	0.35	0.32	0.32	0.32	0.32			
		9	0.45	0.37	0.33	0.44	0.37	0.32	0.36	0.32	0.29	0.36	0.32	0.29	0.29	0.29	0.29			
10	0.42	0.35	0.30	0.42	0.34	0.30	0.34	0.30	0.27	0.33	0.29	0.27	0.27	0.27	0.27					



30

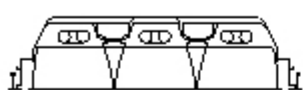
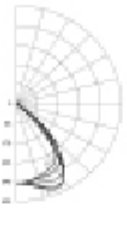
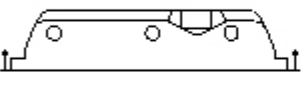

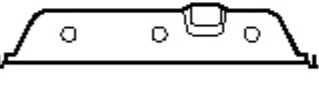
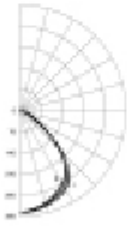
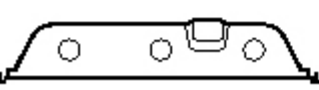
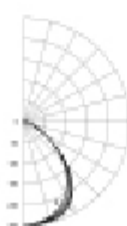


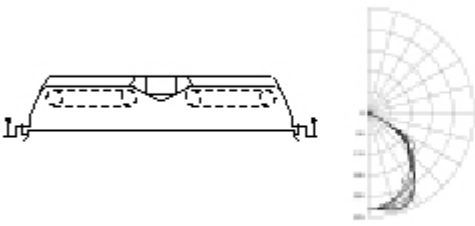
2 × 4, 3-Lamp parabolic troffer,  
1.5 × 1.5 × 1.0" silver louvers,  
RP-1



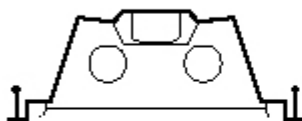
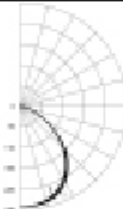

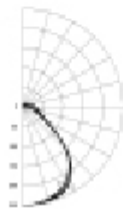
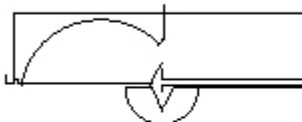
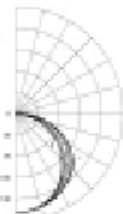
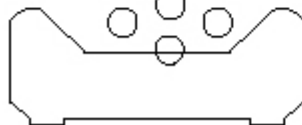
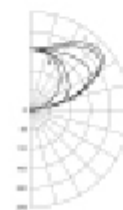
	EFF = 51.4%			% DN = 100			% UP = 0			Lamp = (3) F32T1 SC (along, across)		
	0	1	2	3	4	5	6	7	8	9	10	
0	0.68	0.61	0.55	0.67	0.60	0.55	0.58	0.53	0.50	0.56	0.52	0.48
1	0.63	0.55	0.49	0.61	0.54	0.48	0.52	0.47	0.43	0.50	0.46	0.42
2	0.58	0.49	0.43	0.57	0.48	0.42	0.47	0.42	0.38	0.45	0.41	0.37
3	0.54	0.44	0.38	0.52	0.44	0.38	0.42	0.37	0.33	0.41	0.37	0.33
4	0.50	0.40	0.34	0.49	0.40	0.34	0.39	0.34	0.30	0.38	0.33	0.29
5	0.47	0.37	0.31	0.46	0.37	0.31	0.36	0.30	0.27	0.35	0.30	0.26
6	0.44	0.34	0.28	0.43	0.34	0.28	0.33	0.28	0.24	0.32	0.27	0.24
7	0.41	0.32	0.26	0.40	0.31	0.26	0.30	0.25	0.22	0.30	0.25	0.22
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.77	0.77	0.77	0.76	0.76	0.76	0.72	0.72	0.72	0.69	0.69	0.68

Figure 9-28 Continued

Typical Luminaire	Typical Intensity Distribution	pcc →			80			70			50			30		
		ρw →			70	50	30	70	50	30	50	30	10	50	30	10
		RCR ↓	EFF = 64.6%			% DN = 100%			% UP = 0%			Lamp = (3) F31T1 SC (along, across)				
 2 × 2, 3-Lamp troffer, spec. louvers, 12 cells, RP-1		0	0.77	0.77	0.77	0.75	0.75	0.75	0.72	0.72	0.72	0.69	0.69	0.69		
		1	0.73	0.71	0.69	0.71	0.69	0.68	0.67	0.65	0.64	0.64	0.63	0.62		
		2	0.68	0.65	0.62	0.67	0.64	0.61	0.61	0.59	0.57	0.59	0.58	0.56		
		3	0.64	0.59	0.55	0.63	0.58	0.55	0.56	0.54	0.51	0.55	0.52	0.50		
		4	0.60	0.54	0.50	0.59	0.53	0.50	0.52	0.49	0.46	0.51	0.48	0.45		
		5	0.56	0.50	0.45	0.55	0.49	0.45	0.48	0.44	0.41	0.47	0.43	0.41		
		6	0.53	0.46	0.41	0.51	0.45	0.41	0.44	0.40	0.37	0.43	0.40	0.37		
		7	0.49	0.42	0.38	0.48	0.42	0.37	0.41	0.37	0.34	0.40	0.36	0.34		
		8	0.46	0.39	0.34	0.45	0.39	0.34	0.38	0.34	0.31	0.37	0.33	0.31		
		9	0.43	0.36	0.32	0.43	0.36	0.31	0.35	0.31	0.28	0.34	0.31	0.28		
		10	0.41	0.33	0.29	0.40	0.33	0.29	0.33	0.29	0.26	0.32	0.28	0.26		
 2 × 4, 3-Lamp troffer with A12 lens		EFF = 75.6%			% DN = 100%			% UP = 0%			Lamp = (3) F32T1 SC (along, across)					
		0	0.90	0.90	0.90	0.88	0.88	0.88	0.84	0.84	0.84	0.80	0.80	0.80		
		1	0.83	0.79	0.76	0.81	0.78	0.75	0.75	0.72	0.70	0.72	0.70	0.68		
		2	0.76	0.70	0.65	0.74	0.69	0.64	0.66	0.62	0.59	0.64	0.61	0.58		
		3	0.70	0.62	0.57	0.68	0.61	0.56	0.59	0.54	0.51	0.57	0.53	0.50		
		4	0.64	0.56	0.49	0.63	0.55	0.49	0.53	0.48	0.44	0.51	0.47	0.44		
		5	0.59	0.50	0.44	0.58	0.49	0.43	0.48	0.42	0.38	0.46	0.41	0.38		
		6	0.55	0.45	0.39	0.53	0.45	0.38	0.43	0.38	0.34	0.42	0.37	0.33		
		7	0.51	0.41	0.35	0.50	0.41	0.35	0.39	0.34	0.30	0.38	0.33	0.30		
		8	0.48	0.38	0.31	0.46	0.37	0.31	0.36	0.31	0.27	0.35	0.30	0.27		
		9	0.44	0.35	0.29	0.43	0.34	0.28	0.33	0.28	0.24	0.33	0.28	0.24		
10	0.42	0.32	0.26	0.41	0.32	0.26	0.31	0.26	0.22	0.30	0.25	0.22				
 2 × 4, 3-Lamp troffer with A19 lens		EFF = 72.4%			% DN = 100%			% UP = 0%			Lamp = (3) F32T1 SC (along, across)					
		0	0.86	0.86	0.86	0.84	0.84	0.84	0.80	0.80	0.80	0.77	0.77	0.77		
		1	0.80	0.77	0.75	0.78	0.76	0.73	0.73	0.71	0.69	0.70	0.68	0.67		
		2	0.74	0.69	0.65	0.72	0.68	0.64	0.65	0.62	0.59	0.63	0.60	0.58		
		3	0.69	0.62	0.57	0.67	0.61	0.56	0.59	0.55	0.52	0.57	0.54	0.51		
		4	0.64	0.56	0.50	0.62	0.55	0.50	0.53	0.49	0.45	0.52	0.48	0.44		
		5	0.59	0.51	0.45	0.58	0.50	0.45	0.48	0.44	0.40	0.47	0.43	0.40		
		6	0.55	0.46	0.40	0.54	0.45	0.40	0.44	0.39	0.36	0.43	0.39	0.36		
		7	0.51	0.42	0.36	0.50	0.42	0.36	0.41	0.36	0.32	0.40	0.35	0.32		
		8	0.48	0.39	0.33	0.47	0.38	0.33	0.37	0.32	0.29	0.36	0.32	0.29		
		9	0.45	0.36	0.30	0.44	0.35	0.30	0.35	0.30	0.26	0.34	0.29	0.26		
10	0.42	0.33	0.28	0.41	0.33	0.28	0.32	0.27	0.24	0.31	0.27	0.24				
 2 × 2, 3-Lamp troffer with A12 lens		EFF = 68.4%			% DN = 100			% UP = 0			Lamp = (3) FT40 SC (along, across)					
		0	0.81	0.81	0.81	0.80	0.80	0.80	0.76	0.76	0.76	0.73	0.73	0.73		
		1	0.75	0.72	0.70	0.73	0.71	0.69	0.68	0.66	0.64	0.65	0.64	0.62		
		2	0.69	0.64	0.60	0.68	0.63	0.59	0.61	0.58	0.55	0.59	0.56	0.54		
		3	0.64	0.57	0.52	0.62	0.56	0.52	0.54	0.50	0.47	0.53	0.49	0.46		
		4	0.59	0.52	0.46	0.58	0.51	0.46	0.49	0.45	0.41	0.47	0.44	0.41		
		5	0.55	0.47	0.41	0.53	0.46	0.41	0.44	0.40	0.36	0.43	0.39	0.36		
		6	0.51	0.42	0.37	0.49	0.42	0.36	0.40	0.36	0.32	0.39	0.35	0.32		
		7	0.47	0.39	0.33	0.46	0.38	0.33	0.37	0.32	0.29	0.36	0.32	0.29		
		8	0.44	0.35	0.30	0.43	0.35	0.30	0.34	0.29	0.26	0.33	0.29	0.26		
		9	0.41	0.33	0.27	0.40	0.32	0.27	0.31	0.27	0.24	0.31	0.27	0.24		

lens	10	0.39	0.30	0.25	0.38	0.30	0.25	0.29	0.25	0.22	0.29	0.24	0.21
35	Lamp = (2) F31T8 SC (along, across)												
	EFF = 57.1%				% DN = 100				% UP = 0				
	0	0.68	0.68	0.68	0.66	0.66	0.66	0.63	0.63	0.63	0.61	0.61	0.61
	1	0.64	0.62	0.60	0.62	0.60	0.59	0.58	0.57	0.55	0.56	0.55	0.54
	2	0.59	0.55	0.52	0.58	0.54	0.51	0.52	0.50	0.48	0.51	0.49	0.47
	3	0.55	0.50	0.46	0.53	0.49	0.45	0.47	0.44	0.42	0.46	0.43	0.41
	4	0.51	0.45	0.40	0.49	0.44	0.40	0.43	0.39	0.36	0.41	0.38	0.36
	5	0.47	0.40	0.36	0.46	0.40	0.36	0.39	0.35	0.32	0.38	0.34	0.32
	6	0.43	0.37	0.32	0.42	0.36	0.32	0.35	0.31	0.28	0.34	0.31	0.28
	7	0.40	0.33	0.29	0.39	0.33	0.29	0.32	0.28	0.25	0.31	0.28	0.25
	8	0.38	0.31	0.26	0.37	0.30	0.26	0.29	0.26	0.23	0.29	0.25	0.23
	9	0.35	0.28	0.24	0.34	0.28	0.24	0.27	0.23	0.21	0.27	0.23	0.21
10	0.33	0.26	0.22	0.32	0.26	0.22	0.25	0.21	0.19	0.25	0.21	0.19	

**Figure 9-28 Continued**

Typical Luminaire	Typical Intensity Distribution	$\rho_{cc} \rightarrow$	80			70			50			30			
		$\rho_w \rightarrow$	70	50	30	70	50	30	50	30	10	50	30	10	
		RCR ↓	EFF = 65.1%      % DN = 100%      % UP = 0%									Lamp = (2) F32T8 SC (along, across, ...)			
36			0 1 2 3 4 5 6 7 8 9 10	0.77 0.77 0.77 0.71 0.69 0.66 0.66 0.61 0.57 0.60 0.54 0.49 0.55 0.48 0.43 0.51 0.43 0.38 0.47 0.39 0.34 0.44 0.36 0.30 0.41 0.33 0.27 0.39 0.30 0.25 0.36 0.28 0.23	0.76 0.76 0.76 0.70 0.67 0.65 0.64 0.59 0.56 0.59 0.53 0.48 0.54 0.47 0.42 0.50 0.43 0.37 0.46 0.39 0.33 0.43 0.35 0.30 0.40 0.32 0.27 0.38 0.30 0.25 0.35 0.28 0.23	0.72 0.72 0.72 0.64 0.62 0.61 0.57 0.54 0.51 0.51 0.47 0.44 0.46 0.41 0.38 0.41 0.37 0.33 0.38 0.33 0.29 0.34 0.30 0.26 0.31 0.27 0.24 0.29 0.25 0.21 0.27 0.23 0.19	0.69 0.69 0.69 0.62 0.60 0.59 0.55 0.52 0.50 0.49 0.46 0.43 0.44 0.40 0.37 0.40 0.36 0.33 0.36 0.32 0.29 0.33 0.29 0.26 0.31 0.27 0.23 0.28 0.24 0.21 0.26 0.22 0.19								
37				EFF = 68.9%      % DN = 91.4%      % UP = 8.6%									Lamp = (2) F32T8 SC (along, across, ...)		
			0 1 2 3 4 5 6 7 8 9 10	0.81 0.81 0.81 0.74 0.71 0.68 0.68 0.62 0.58 0.62 0.55 0.50 0.57 0.50 0.44 0.53 0.45 0.39 0.49 0.40 0.35 0.46 0.37 0.31 0.42 0.34 0.28 0.40 0.31 0.26 0.37 0.29 0.23	0.78 0.78 0.78 0.71 0.68 0.66 0.65 0.61 0.56 0.60 0.54 0.49 0.55 0.48 0.43 0.51 0.43 0.38 0.47 0.39 0.34 0.44 0.36 0.31 0.41 0.33 0.28 0.38 0.30 0.25 0.36 0.28 0.23	0.73 0.73 0.73 0.64 0.62 0.60 0.57 0.54 0.51 0.51 0.47 0.44 0.46 0.41 0.38 0.41 0.37 0.33 0.38 0.33 0.29 0.34 0.30 0.26 0.32 0.27 0.23 0.29 0.24 0.21 0.27 0.22 0.19	0.69 0.69 0.69 0.61 0.59 0.58 0.54 0.51 0.49 0.48 0.45 0.42 0.44 0.40 0.37 0.39 0.35 0.32 0.36 0.32 0.29 0.33 0.29 0.26 0.30 0.26 0.23 0.20 0.24 0.21 0.26 0.22 0.19								
38				EFF = 54.2%      % DN = 99.2%      % UP = 0.5%									Lamp = (2) FT36* SC (along, across, ...)		
			0 1 2 3 4 5 6 7 8 9 10	0.65 0.65 0.65 0.58 0.55 0.53 0.53 0.48 0.44 0.48 0.42 0.37 0.43 0.37 0.32 0.40 0.33 0.27 0.37 0.29 0.24 0.34 0.26 0.21 0.32 0.24 0.19 0.29 0.22 0.17 0.28 0.20 0.16	0.63 0.63 0.63 0.57 0.54 0.52 0.51 0.47 0.43 0.46 0.41 0.36 0.42 0.36 0.31 0.39 0.32 0.27 0.36 0.29 0.24 0.33 0.26 0.21 0.31 0.24 0.19 0.29 0.22 0.17 0.27 0.20 0.16	0.60 0.60 0.60 0.52 0.50 0.48 0.45 0.41 0.39 0.39 0.35 0.32 0.34 0.30 0.27 0.31 0.26 0.23 0.28 0.23 0.20 0.25 0.21 0.18 0.23 0.19 0.16 0.21 0.17 0.14 0.19 0.15 0.13	0.58 0.58 0.58 0.49 0.48 0.46 0.43 0.40 0.38 0.37 0.34 0.31 0.33 0.29 0.27 0.30 0.26 0.23 0.27 0.23 0.20 0.24 0.20 0.18 0.22 0.18 0.16 0.20 0.17 0.14 0.19 0.15 0.13								
39				EFF = 84.1%      % DN = 0      % UP = 100									Lamp = (2) F32T8 SC (along, across, ...)		
			0 1 2 3 4 5 6 7	0.80 0.80 0.80 0.73 0.69 0.66 0.66 0.61 0.56 0.60 0.53 0.48 0.55 0.47 0.41 0.50 0.41 0.35 0.46 0.37 0.31 0.42 0.33 0.27	0.68 0.68 0.68 0.62 0.59 0.57 0.56 0.52 0.48 0.51 0.46 0.41 0.47 0.40 0.35 0.43 0.36 0.30 0.39 0.32 0.27 0.36 0.28 0.23	0.47 0.47 0.47 0.41 0.39 0.38 0.36 0.33 0.31 0.31 0.28 0.26 0.28 0.25 0.22 0.24 0.21 0.19 0.22 0.19 0.16 0.20 0.16 0.14	0.27 0.27 0.27 0.23 0.23 0.22 0.21 0.19 0.18 0.18 0.17 0.15 0.16 0.14 0.13 0.14 0.12 0.11 0.13 0.11 0.10 0.11 0.10 0.09								

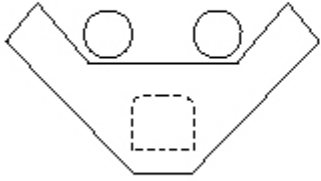
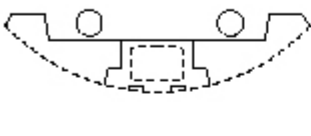
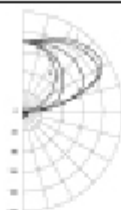
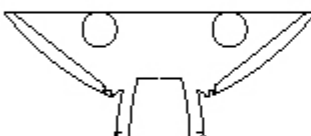
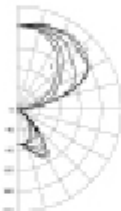


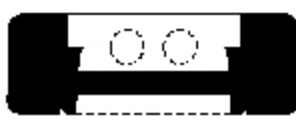

9" Wide, thin profile, wide spread indirect	8	0.39	0.30	0.24	0.33	0.26	0.21	0.18	0.14	0.12	0.10	0.09	0.07
	9	0.36	0.27	0.21	0.31	0.23	0.18	0.16	0.13	0.11	0.09	0.08	0.06
	10	0.34	0.24	0.19	0.29	0.21	0.16	0.15	0.11	0.09	0.08	0.07	0.06
40  V-shaped, completely indirect	EFF = 88.3%      % DN = 0      % UP = 100      Lamp = (2) F32T8 SC (along, across)												
	0	0.84	0.84	0.84	0.72	0.72	0.72	0.49	0.49	0.49	0.28	0.28	0.28
	1	0.76	0.73	0.70	0.65	0.62	0.60	0.43	0.41	0.40	0.25	0.24	0.23
	2	0.70	0.64	0.59	0.59	0.54	0.50	0.37	0.35	0.33	0.22	0.20	0.19
	3	0.63	0.56	0.50	0.54	0.48	0.43	0.33	0.30	0.27	0.19	0.17	0.16
	4	0.58	0.49	0.43	0.49	0.42	0.37	0.29	0.26	0.23	0.17	0.15	0.14
	5	0.53	0.43	0.37	0.45	0.37	0.32	0.26	0.22	0.20	0.15	0.13	0.12
	6	0.48	0.39	0.32	0.41	0.33	0.28	0.23	0.19	0.17	0.13	0.11	0.10
	7	0.45	0.35	0.28	0.38	0.30	0.24	0.21	0.17	0.15	0.12	0.10	0.09
	8	0.41	0.31	0.25	0.35	0.27	0.22	0.19	0.15	0.13	0.11	0.09	0.08
	9	0.38	0.28	0.22	0.32	0.24	0.19	0.17	0.13	0.11	0.10	0.08	0.07
	10	0.35	0.26	0.20	0.30	0.22	0.17	0.15	0.12	0.10	0.09	0.07	0.06

Figure 9-28 Continued

Typical Luminaire	Typical Intensity Distribution	$\rho_{cc} \rightarrow$	80			70			50			30		
		$\rho_w \rightarrow$	70	50	30	70	50	30	50	30	10	50	30	10
		RCR $\downarrow$	EFF = 82.4%      % DN = 5.4%      % UP = 94.6%									Lamp = (2) F32T SC (along, across)		
 Indirect with perforated metal underside		0	0.80	0.80	0.80	0.69	0.69	0.69	0.48	0.48	0.48	0.30	0.30	0.3
		1	0.72	0.69	0.66	0.62	0.59	0.57	0.42	0.40	0.39	0.27	0.25	0.2
		2	0.66	0.60	0.55	0.56	0.52	0.48	0.37	0.34	0.32	0.22	0.21	0.2
		3	0.60	0.53	0.47	0.51	0.45	0.41	0.32	0.29	0.27	0.20	0.18	0.1
		4	0.55	0.46	0.40	0.47	0.40	0.35	0.28	0.25	0.23	0.17	0.16	0.1
		5	0.50	0.41	0.35	0.43	0.36	0.30	0.25	0.22	0.19	0.16	0.14	0.1
		6	0.46	0.37	0.30	0.39	0.32	0.27	0.23	0.19	0.17	0.14	0.12	0.1
		7	0.42	0.33	0.27	0.36	0.28	0.23	0.20	0.17	0.14	0.13	0.11	0.0
		8	0.39	0.29	0.24	0.33	0.26	0.21	0.18	0.15	0.13	0.11	0.09	0.0
		9	0.36	0.27	0.21	0.31	0.23	0.18	0.17	0.13	0.11	0.10	0.08	0.0
		10	0.33	0.24	0.19	0.29	0.21	0.16	0.15	0.12	0.10	0.05	0.08	0.0
 Semi-indirect, 2-lamp, v-shape, parabolic baffles		EFF = 83.2%      % DN = 21.6%      % UP = 78.4%      Lamp = (2) F32T SC (along, across)												
		0	0.83	0.83	0.83	0.74	0.74	0.74	0.56	0.56	0.56	0.39	0.39	0.3
		1	0.76	0.73	0.70	0.67	0.65	0.62	0.49	0.48	0.46	0.35	0.34	0.3
		2	0.70	0.64	0.59	0.62	0.57	0.53	0.44	0.41	0.39	0.31	0.30	0.2
		3	0.64	0.57	0.51	0.56	0.50	0.46	0.39	0.36	0.33	0.28	0.26	0.2
		4	0.58	0.50	0.44	0.52	0.45	0.40	0.35	0.31	0.28	0.25	0.23	0.2
		5	0.54	0.45	0.39	0.47	0.40	0.35	0.31	0.27	0.25	0.23	0.20	0.1
		6	0.49	0.40	0.34	0.44	0.36	0.31	0.28	0.24	0.21	0.20	0.18	0.1
		7	0.46	0.36	0.30	0.40	0.32	0.27	0.25	0.22	0.19	0.19	0.16	0.1
		8	0.42	0.33	0.27	0.37	0.29	0.24	0.23	0.19	0.17	0.17	0.15	0.1
		9	0.39	0.30	0.24	0.35	0.27	0.22	0.21	0.17	0.15	0.16	0.13	0.1
		10	0.37	0.27	0.22	0.32	0.24	0.20	0.19	0.16	0.13	0.14	0.12	0.1
 Semi-indirect, 2-lamp, thin profile, parabolic baffles, 70% up		EFF = 85.2%      % DN = 28.7%      % UP = 71.3%      Lamp = (2) F32T SC (along, across)												
		0	3.87	0.87	0.87	0.78	0.78	0.78	0.61	0.61	0.61	0.45	0.45	0.4
		1	3.80	0.77	0.74	0.72	0.69	0.66	0.54	0.53	0.51	0.41	0.40	0.3
		2	0.73	0.68	0.63	0.66	0.61	0.57	0.48	0.46	0.44	0.37	0.35	0.3
		3	0.67	0.60	0.55	0.60	0.54	0.50	0.43	0.40	0.37	0.33	0.31	0.2
		4	0.62	0.54	0.48	0.55	0.49	0.43	0.39	0.35	0.32	0.30	0.28	0.2
		5	0.57	0.48	0.42	0.51	0.44	0.38	0.35	0.31	0.28	0.27	0.25	0.2
		6	0.53	0.43	0.37	0.47	0.39	0.34	0.32	0.28	0.25	0.25	0.22	0.2
		7	0.49	0.39	0.33	0.44	0.36	0.30	0.29	0.25	0.22	0.23	0.20	0.1
		8	0.45	0.35	0.29	0.41	0.32	0.27	0.26	0.22	0.20	0.21	0.18	0.1
		9	0.42	0.32	0.26	0.38	0.30	0.24	0.24	0.20	0.18	0.19	0.16	0.1
		10	0.39	0.30	0.24	0.35	0.27	0.22	0.22	0.18	0.16	0.18	0.15	0.1
		EFF = 88.3%      % DN = 40.3      % UP = 59.7      Lamp = (2) F32T SC (along, across)												
		0	0.93	0.93	0.93	0.84	0.84	0.84	0.69	0.69	0.69	0.55	0.55	0.5
		1	0.85	0.82	0.79	0.77	0.75	0.72	0.61	0.60	0.58	0.49	0.48	0.4
		2	0.78	0.72	0.67	0.71	0.66	0.62	0.54	0.51	0.49	0.44	0.42	0.4
		3	0.71	0.64	0.58	0.65	0.58	0.53	0.48	0.45	0.42	0.39	0.37	0.3
		4	0.65	0.57	0.50	0.60	0.52	0.46	0.43	0.39	0.36	0.35	0.32	0.3


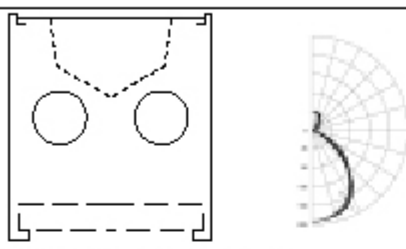
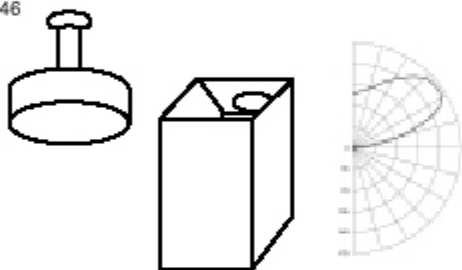

Direct/indirect, 2-lamp, thin profile, parabolic baffles, 60% up		6	0.55	0.45	0.38	0.50	0.42	0.36	0.35	0.30	0.27	0.28	0.25	0.2
		7	0.51	0.41	0.34	0.47	0.38	0.32	0.32	0.27	0.24	0.26	0.23	0.2
		8	0.47	0.37	0.30	0.43	0.34	0.28	0.29	0.24	0.21	0.24	0.20	0.1
		9	0.44	0.34	0.27	0.40	0.31	0.25	0.26	0.22	0.19	0.22	0.18	0.1
		10	0.41	0.31	0.25	0.37	0.28	0.23	0.24	0.20	0.17	0.20	0.17	0.1

Figure 9-28 Continued

Typical Luminaire	Typical Intensity Distribution	$\rho_{cc} \rightarrow$			80			70			50			30		
		$\rho_w \rightarrow$			70			50			50			50		
		RCR														
		↓			EFF = 53.4%			% DN = 81.7%			% UP = 18.3%			Lamp = (2) F32T8 SC (along, across)		
45		0	0.61	0.61	0.61	0.59	0.59	0.59	0.54	0.54	0.54	0.50	0.50	0.50		
		1	0.57	0.55	0.53	0.55	0.53	0.51	0.49	0.48	0.47	0.45	0.44	0.44		
		2	0.53	0.49	0.46	0.51	0.48	0.45	0.44	0.42	0.40	0.41	0.39	0.36		
		3	0.49	0.44	0.41	0.47	0.43	0.39	0.40	0.37	0.35	0.37	0.35	0.33		
		4	0.45	0.40	0.36	0.43	0.38	0.35	0.36	0.33	0.31	0.34	0.31	0.29		
		5	0.42	0.36	0.32	0.40	0.35	0.31	0.33	0.30	0.27	0.31	0.28	0.26		
		6	0.39	0.33	0.29	0.37	0.32	0.28	0.30	0.27	0.24	0.28	0.25	0.23		
		7	0.36	0.30	0.26	0.35	0.29	0.25	0.27	0.24	0.22	0.26	0.23	0.21		
		8	0.34	0.27	0.23	0.32	0.27	0.23	0.25	0.22	0.19	0.24	0.21	0.19		
		9	0.32	0.25	0.21	0.30	0.24	0.21	0.23	0.20	0.18	0.22	0.19	0.17		
		10	0.30	0.23	0.19	0.29	0.23	0.19	0.21	0.18	0.16	0.20	0.18	0.16		
6" square x-section, mostly downlight																
46		EFF = 73%			% DN = 90%			% UP = 100%			Lamp = M400/U (			SC (along, across)		
		0	0.69	0.69	0.69	0.59	0.59	0.59	0.41	0.54	0.41	0.23	0.23	0.23		
		1	0.63	0.60	0.58	0.54	0.52	0.43	0.35	0.34	0.33	0.20	0.20	0.19		
		2	0.57	0.53	0.48	0.49	0.45	0.42	0.31	0.29	0.27	0.18	0.17	0.16		
		3	0.52	0.46	0.41	0.45	0.39	0.36	0.27	0.25	0.23	0.16	0.14	0.13		
		4	0.48	0.41	0.35	0.41	0.35	0.31	0.24	0.21	0.19	0.14	0.12	0.11		
		5	0.44	0.36	0.31	0.37	0.31	0.26	0.21	0.18	0.16	0.12	0.11	0.10		
		6	0.40	0.32	0.27	0.34	0.27	0.23	0.19	0.16	0.14	0.11	0.09	0.08		
		7	0.37	0.29	0.23	0.31	0.25	0.20	0.17	0.14	0.12	0.10	0.08	0.07		
		8	0.34	0.26	0.21	0.29	0.22	0.18	0.15	0.13	0.11	0.09	0.07	0.06		
		9	0.31	0.23	0.18	0.27	0.20	0.16	0.14	0.11	0.09	0.08	0.07	0.05		
		10	0.29	0.21	0.16	0.25	0.18	0.14	0.13	0.10	0.08	0.07	0.06	0.05		
Completely indirect HID																
47		EFF = 71.6%			% DN = 0.3%			% UP = 99.7%			Lamp = (1) F32T8 SC (along, across)					
		0	0.42	0.35	0.30	0.40	0.34	0.30	0.32	0.28	0.26	0.30	0.27	0.25		
		1	0.40	0.32	0.28	0.38	0.31	0.27	0.30	0.26	0.24	0.28	0.25	0.23		
		2	0.37	0.30	0.26	0.36	0.29	0.25	0.28	0.24	0.22	0.26	0.23	0.21		
		3	0.35	0.28	0.24	0.34	0.27	0.23	0.26	0.22	0.20	0.25	0.22	0.19		
		4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
		5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
		6	0.67	0.67	0.67	0.64	0.64	0.64	0.58	0.58	0.58	0.53	0.53	0.53		
		7	0.62	0.59	0.57	0.59	0.57	0.55	0.52	0.50	0.49	0.48	0.46	0.45		
		8	0.57	0.53	0.50	0.55	0.51	0.48	0.47	0.45	0.43	0.43	0.41	0.40		
		9	0.53	0.48	0.44	0.51	0.46	0.43	0.43	0.40	0.37	0.40	0.37	0.35		
		10	0.50	0.44	0.39	0.47	0.42	0.38	0.39	0.36	0.33	0.36	0.34	0.32		
Fluorescent cove with specular reflector																

Notes: EFF = efficiency; SC = spacing criteria.

For 6" reflector with PAR-38, multiply by 0.98.

For A12 lens, 2 x 4's, ratio of F40 to T8, 0.96, 0.94, and 0.89 for 2, 3, and 4-lamp versions.

For A12 lens, 2 x 4's, ratio of 2 to 3-lamp effc. = 1.05; ratio of 4 to 3-lamp effc. = 0.98.

For parabolics, 2 lamp versions have 12 cells, 4 lamp versions have 32 cells.

For 3" parabolic, 2 x 4's, ratio of 2 to 3-lamp effc. = 1.06; ratio of 4 to 3-lamp effc. = 0.96.

For 4" parabolic, 2 x 4's, ratio of 2 to 3-lamp effc. = 0.98; ratio of 4 to 3-lamp effc. = 0.90.

CUs do not consider shadowing of the lighting fixture or cove.

\* Different lamp types have been considered in determining the listed photometric report.

Figure 9-28 Coefficients of Utilization for Typical Luminaires

## Average Exitance Calculations: The Lumen Method

Exitance calculations are greatly simplified through the use of exitance coefficients (ECs). These coefficients, like coefficients of utilization, may be computed for any luminaire, although they are somewhat rare in manufacturers' literature.